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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/943,237 | 08/29/2001 | Denis H. Endisch | H0001273 (4780) | 9386 |

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ROBERT D. FISH; RUTAN & TUCKER, LLP
P.O. BOX 1950
611 ANTON BLVD., 14TH FLOOR
COSTA MESA, CA 92628-1950

EXAMINER

GUERRERO, MARIA F

ART UNIT PAPER NUMBER

2822

DATE MAILED: 03/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/943,237

Applicant(s)

ENDISCH ET AL.

Examiner

Maria Guerrero

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 January 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 1-11 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 20 is/are allowed.
- 6) ☒ Claim(s) 12-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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DETAILED ACTION

1. This Office Action is responsive to the Request for Continued Examination, the Amendment and the Terminal Disclaimer filed January 21, 2003.

Claims 21-23 are canceled.

Claims 1-20 are pending.

Election/Restrictions

2. Applicant's election of Group II (claims 12-23) in Paper No. 6 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claims 1-11 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 6.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 12-14 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gardner et al. (U.S. 6,194,283) in view of Fulford, Jr. et al. (U.S. 6,008,109).

Gardner et al. teaches forming a trench in a substrate having a surface, depositing a first compound (methylsilsesquioxane, hydrogen silsesquioxane) into the trench, partially removing the first compound from the trench to be below the surface of the substrate, depositing a second compound onto the first compound by chemical vapor deposition (Fig. 5-7B, col. 3, lines 15-37, col. 5, lines 30-40, 53-67, col. 6, lines 1-5). Gardner et al. discloses a thermal oxide coat on the trench, removing the first compound from the trench by a dry or wet etch process (col. 5, lines 20-21, 64-67). Gardner et al. teaches planarizing to form the upper surface of the second compound substantially coplanar with the surface of the substrate (Fig. 9, col. 6, lines 15-32).

Gardner et al. is silent about using spin-on deposition. However, Fulford, Jr. et al. teaches forming a trench in a substrate having a surface, depositing a first compound (methylsilsesquioxane) into the trench using spin-on deposition (Fig. 5-8a, 10, col. 7, lines 4-50). Fulford, Jr. et al. teaches a thermal oxide coat on the trench and the second compound being formed from silane (col. 6, lines 15-18, col. 7, lines 25-35).

Since Gardner et al. and Fulford, Jr. et al. are both from the same field of endeavor of forming isolation structures; the purpose disclosed by Fulford, Jr. et al. would have been recognized in the pertinent art of Gardner et al.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Gardner et al. reference by specifying the deposition of the first compound by spin-on deposition as taught Fulford, Jr. et al. The modification is proper because both references employed the same compounds as the first

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compound on the trench (Fulford, Jr. et al., col. 7, lines 9-15; Gardner et al., col. 5, lines 30-40).

4. Claims 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gardner et al. (U.S. 6,194,283) and Fulford, Jr. et al. (U.S. 6,008,109) as applied to claims 12-14 and 17-19 above, and further in view of Koyanagi (U.S. 6,191,002).

Regarding claims 15-16, Gardner et al. discloses the first compound being an oxide and the trench having an aspect ratio greater than 0.8 (col. 5, lines 30-35, col. 8, lines 10-13).

The combination of Gardner et al. and Fulford, Jr. et al. fails to show curing the first compound to form an oxide, the aspect ratio being no less than 5. However, Koyanagi shows spin coating silicon containing material on the trench and curing the silicon containing material to form the oxide. Koyanagi also teaches the trench having the aspect ratio of 5 (col. 7, lines 60-63, col. 8, lines 1-20, col. 9, lines 20-25, col. 12, lines 15-36).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to include the step of curing the first compound to form the oxide and to use the aspect ratio of 5 as taught Koyanagi. The modification would prevent voids, cracks, and depressions in the isolation structure (Koyanagi, col. 4, lines 50-55; Gardner et al., col. 1, lines 8-10).

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Allowable Subject Matter

5. Claim 20 is allowed.

The following is a statement of reasons for the indication of allowable subject matter: Endisch et al. (U.S. 6,140,254) has been removed as prior art in view of the Declaration and the Terminal disclaimer filed January 21, 2003.

Response to Arguments

6. Applicant's arguments with respect to claims 12-19 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 703-305-0162.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 703-308-4905. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Maria Guerrero
Maria Guerrero
Patent Examiner
March 21, 2003